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Clayton

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Industrial Hygiene Assessment for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation
Clayton Project No. 31204.00/F-19615
October 23, 1990

ABD 002 0402

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MDE 0002889

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1.0 INTRODUCTION

Mr. Taylor Treat, Project Supervisor of OH Materials Corporation, retained Clayton Environmental Consultants, Inc. to perform an industrial hygiene assessment for asbestos at 257 New Vernon Road in Meyersville, New Jersey. The assessment was limited to area air sampling for total airborne fibers and building material sampling for asbestos.

Mr. Jeffrey Kaplan, Industrial Hygienist of Clayton's Edison, New Jersey, office, conducted the assessment on September 11, 1990. Mr. Treat accompanied Mr. Kaplan and selected sampling locations. He was available to answer questions during the assessment.

This site was placed on the United States Environmental Protection Agency (USEPA) National Priority List (NPL) in the early 1980's. OH Materials Corporation was retained by the USEPA to alleviate any immediate life threatening situations. According to the USEPA, this 30-acre property, known as the Millington Site, was used as a satellite dump in the late 1960's for refuse from National Gypsum. According to information from the USEPA, in two areas of the property, National Gypsum landfilled refuse, including loose asbestos fibers, broken asbestos tiles, and siding.

The purpose of the assessment was to determine total airborne fiber concentrations outdoors and in dwelling 1 on the site and to determine asbestos content of the building materials in dwellings 1 and 2, the garage, shed 1 (roof only), and sheds 2 and 3.

The scope of the services provided by Clayton is described in the confirmation letter, dated September 17, 1990, which includes an explanation of the terms and conditions under which the work was provided.

Appendix A presents analytical results. Appendix B presents brief summaries of the sampling and analytical methods. Appendix C presents precautionary measures for routine maintenance and remodeling operations. Appendix D presents toxicological information. Appendix E presents Mr. Kaplan's credentials.

2.0 SUMMARY AND RECOMMENDATIONS

2.1 SUMMARY

Clayton performed area airborne fiber sampling and building material sampling for asbestos. Clayton analyzed these samples in its Edison, New Jersey, and Kennesaw, Georgia, laboratories.

2.1.1 Air Samples

Clayton collected 10 area air samples outdoors on the property and 1 area air sample inside dwelling 1 at 257 New Vernon Road. Clayton analyzed these samples in its Edison, New Jersey, laboratory by phase contrast microscopy (PCM) using National Institute for Occupational Safety and Health (NIOSH) Method 7400.

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A Rules. This method measures total airborne fibers and is not specific for asbestos.

Analytical results indicated airborne fiber concentrations outdoors ranged from less than 0.002 fibers per cubic centimeter of air (f/cc). The airborne fiber concentration inside dwelling 1 was 0.001 f/cc.

At the request of Mr. Mike Neill, Onsite Coordinator (OSC), of the USEPA, Clayton submitted the airborne fiber sample collected inside dwelling 1 to its laboratory for transmission electron microscopy (TEM) analysis, NIOSH Method 7402, to determine the airborne asbestos fiber concentration. The total asbestos fiber concentration was less than 0.00040 f/cc (see Appendix A, Table 2).

2.1.2 Bulk Material Samples

Clayton collected building material samples inside dwellings 1 and 2, inside the garage, and from the roof of shed 1 at 257 New Vernon Road to determine asbestos content (see Appendix A, Table 3). Clayton did not use destructive sampling techniques to perform the assessment.

The Clayton laboratory analyzed the samples for asbestos content using the technique of polarized light microscopy (PLM) and following the USEPA PLM protocol for determining asbestos fibers in bulk insulation materials.

The samples collected from accessible areas of dwelling 1, the garage, and shed 1 did not contain asbestos fibers at or above the limit of detection. No material samples were collected from sheds 2 and 3. Shed 2, east of shed 3, near the garage, did not contain obvious suspect asbestos-containing material inside the structure. The roof was not sampled. Shed 3, west shed, near the garage, was inaccessible because of the many items stored inside the structure. Floor covering was observed; however, at Mr. Treat's request, floor and roofing materials were not sampled.

Dwelling 2 contained the following asbestos-containing material:

- White fibrous insulation inside the north wall of the 1st floor
- Upper layer of floor covering on the 1st floor
- 2d layer of floor tile on the 1st floor
- Blue fibrous insulation inside the north ceiling on the 2d floor

2.2 RECOMMENDATIONS

Air sampling should be conducted in areas with the greatest potential for generating airborne asbestos fibers, such as dwelling 2. If corrective action is necessary, air sampling will help establish priorities for such actions by identifying areas where asbestos-containing materials pose immediate concern. However, the results of air sampling are indicative of the status of airborne fibers only at the time of sampling.

It has been our experience that, unless damaged or disturbed, cohesive asbestos-containing materials do not tend to become airborne. However, it is conceivable that water damage, maintenance activities, or vandalism could disturb the asbestos-

containing materials, thereby increasing the risk of generating significant airborne asbestos fiber concentrations. To prevent this potential hazard, you may wish to consider removing, encapsulating, or enclosing all exposed asbestos-containing materials. In each case, the optimum control option will depend on the amount of material present, and its location and condition. We will be available to work with you to select and implement the best option.

As an alternative to removal, or in the interim, steps should be taken to prevent the potential release of fibers by repairing all damaged asbestos-containing materials. These materials should be examined and repaired regularly to prevent the release of airborne fibers. In addition, an effective asbestos management program should be implemented which would include taking precautions to protect employees during routine maintenance and building renovation activities. A brief summary of these precautions are provided in Appendix C.

Based on the results of this assessment, we recommend that the surveillance and controls described above be implemented whenever employees are engaged in activities on any materials in which asbestos has been identified. These materials are identified and described in Section 4 of this report.

The USEPA requires that asbestos-containing materials (1 percent or greater asbestos content) be removed prior to demolition of a building. During renovation and demolition operations, materials may be uncovered which are different from those accessible for sampling during this assessment. Additional sampling to identify asbestos-containing materials may be necessary during these activities. Personnel in charge of renovation or demolition should be alerted to note materials uncovered during these operations which differ substantially from those included in this assessment. Additional sampling should be done to determine the composition of the materials.

Analysis of floor tile and other resinously bound materials by the USEPA technique (PLM) may yield false negative results because of method limitations in separating closely-bound fibers and in detecting fibers of small length and diameter. When analysis of such materials by the USEPA technique yields negative results for the presence of asbestos, Clayton recommends utilizing confirmatory methods of identification, such as TEM.

We recommend TEM analysis for the floor tile sample collected on the first floor, southeast room, in dwelling 2. Alternatively, you may choose to treat this material as if it contains asbestos and defer additional analysis until such time as renovation or remodeling operations involving removal, scraping, cutting, grinding, sawing, drilling, or sanding the material are planned. Because the material is not friable, the potential for fibers becoming airborne is limited, except during operations such as those described above. However, employees should be cautioned about engaging in these operations unless appropriate precautions are implemented.

3.0 STANDARDS AND GUIDELINES

The Occupational Safety and Health Administration (OSHA) standards and guidelines apply to employees. The OSHA asbestos standard mandates a

permissible exposure limit (PEL) of 0.2 f/cc (for fibers longer than 5 micrometers) determined as an 8-hour time-weighted average (TWA) and an excursion limit of 1.0 f/cc as a 30-minute TWA. The OSHA action level is 0.1 f/cc, the level at which medical monitoring and other activities are required.

In addition to these exposure criteria, the USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 Code of Federal Regulations [CFR] 61, Subparts A and M) should also be considered during any maintenance or renovation activities which might disturb the asbestos-containing materials.

The USEPA considers a material with an asbestos fiber content above 1 percent as asbestos-containing. The USEPA has limited the asbestos content of some materials to 1 percent; however, asbestos has not been eliminated from all manufactured building materials. Therefore, the age of a building or remodeling project cannot be the basis for assuming that a material does not contain asbestos.

4.0 RESULTS AND DISCUSSION

4.1 DESCRIPTION OF BUILDINGS

There are two residences, a garage, and three sheds.

Dwelling 1, located in the southern portion of the 30-acre property, is an occupied two-family house. The structure consists of three floors and an attic.

Dwelling 2, located in the northern portion of the property, is currently under renovation. The house contains three floors and an attic and was unoccupied at the time.

The two-story garage is located in the northeastern portion of the property and is currently being used for business purposes by the owner of the property.

Shed 1 has one level and is located in the southwestern portion of the property. The shed is currently scheduled to be dismantled.

Sheds 2 and 3, both one-floor structures, are located on the northeastern portion of the property near the garage. Shed 2, located east of shed 3, is being used to store materials. Shed 3 is not being used.

4.2 DESCRIPTION OF ASSESSMENT

The Clayton investigator inspected each floor of the buildings for suspect asbestos-containing materials. Our assessment resulted in the collection of samples of materials for testing. As detailed in Appendix A, asbestos was identified in the material we tested. Samples were collected from the following materials:

Dwelling 1

- Air-conditioning filters
- Roofing felt paper on an inside wall

- Dust samples in the basement
- Plasterboard in basement

Dwelling 2

- Insulating material in walls
- Covering on fiberglass materials
- Floor tile
- Plaster materials
- Shingles materials being stored
- Roofing felt paper located on an inside wall
- Floor mastic material
- Insulating material in ceiling

Garage

- Roofing shingle material stored on upper floor
- Roofing felt material stored on upper floor
- Roofing felt material located on window frame

Shed 1

Roofing materials

Sampling certain building materials requires destructive techniques. Therefore, the following materials were not sampled during the building assessment with the exception of roofing material in shed 1:

- exterior building materials, such as roofing or siding
- coated wall and ceiling materials, such as drywall, drywall tape, and spackling
- covered flooring materials
- caulking
- gaskets or other similar materials
- concrete or cinderblock
- pressed wood products

The northside of dwelling 1 was locked and inaccessible at the time of the assessment. Shed 3 was inaccessible at the time of the assessment because of obstructing objects stored inside the shed. Mr. Treat selected the materials to be sampled and the number of samples to be collected. Clayton utilized Asbestos Hazard Emergency Response Act (AHERA) sampling protocol when applicable.

Samples collected from dwelling 1, the garage, and shed 1 did not contain asbestos fibers at or above the limit of detection. Shed 2 did not contain obvious suspect asbestos-containing material inside the structure. Shed 3 was not sampled due to inaccessibility.

Samples of floor tile and insulating materials inside the north wall and ceiling in dwelling 2 contain asbestos fibers. The asbestos-containing materials located inside the wall and ceiling are in poor condition. Clayton observed the white fibrous


insulation that contained 70 percent chrysotile asbestos inside other walls that was mixed with the brown cellulose filler. This insulation was also observed inside other walls through holes and in debris on the floors throughout the first and second levels. Individuals who work in these areas should be alerted that these materials contain asbestos and should not be disturbed during renovations.

Clayton recommends additional samples be collected from the plaster located on the second floor ceiling and the shingles located in the basement, both inside dwelling 2. These samples show layers of the material contain greater than 1 percent asbestos; however, the overall sample contains less than 1 percent asbestos. The high asbestos fiber content may be caused by contamination from other materials in the areas.

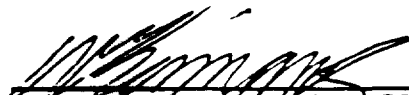
Shed 3 contained floor material; this material was not sampled. Roofing and siding materials on dwellings 1 and 2 and on sheds 2 and 3 were not sampled.

It is not unusual to find variation in results for the same material, since the asbestos may be unevenly distributed in the matrix. For this reason, if one sample of a material indicates the presence of asbestos, the material should be treated as asbestos-containing, even if other samples are negative.

This report submitted by:


Jeffrey Kaplan
Industrial Hygienist

This report approved by:


William L. Komianos, CIP, CSP
Manager, Industrial Hygiene Services
Northeastern Operations
October 23, 1990

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APPENDIX A
ANALYTICAL RESULTS

ABD 002 0410

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Table 1
Analytical Results of Area Air Sampling for
Airborne Fibers
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location	<u>Sampling Period</u>		<u>Air Volume</u> (liters)	<u>Airborne Fiber Concentration</u> (f/cc)
		Start	Stop		
OHM-0911-1 (139285)	Corner where South Driveway and New Vernon Road Meet	0841	1622	1268	0.002
OHM-0911-2 (139286)	Approximately 30 Feet South-West of Shed 1, Approximately 20 Feet from New Vernon Road	0845	1621	1277	<0.002
OHM-0911-3 (139287)	South Corner of Property Line, Approximately 5 Feet from New Vernon Road	0850	1618	1232	<0.002
OHM-0911-4 (139288)	Corner where North Driveway and New Vernon Road Meet	0855	1625	1283	<0.002
OHM-0911-5 (139289)	Northeast Corner of Residence 1, outside Fence	0900	1628	1232	<0.002
OHM-0911-6 (139290)	Approximately 10 Feet Northwest of Corner of Shed 2, at East End of North Driveway	0906	1632	1227	<0.002
OHM-0911-7 (139291)	Approximately 5 Feet Southeast of Shed 3, Approximately 20 Feet Northeast of Garage	0910	1635	1224	<0.002
OHM-0911-8 (139292)	South Trail, Directly South of Garage	0917	1639	1216	<0.002
OHM-0911-9 (139293)	East End of South Driveway, Edge of Trail leading to North Driveway	0927	1642	1218	<0.002
OHM-0911-10 (139294)	South Side of Residence at Entrance to Basement	0940	1645	1211	<0.002

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Table 1
Analytical Results of Area Air Sampling for
Airborne Fibers
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location	Sampling Period		Air Volume (liters)	Airborne Fiber Concentration (f/cc)
		Start	Stop		
OHM-0911-11 (139295)	Inside Residence, 1st Floor in Kitchen, Edge of Counter	1120	1340	1848	0.001

"<" means less than.

f/cc means fibers per cubic centimeter of air.

Analytical Method: NIOSH 7400, A Rules

Limit of Detection: 2,000 fibers per filter

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Table 2

Analytical Results of TEM Analysis for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615
Kennesaw Lab Report No. E901094

Date Received: September 27, 1990
Grid Opening Size: 0.013 mm²
Filter Type: MCE, 25 mm

Date Completed: September 28, 1990
Microscope: Philips CM-12
Magnification: 15,000

Client #	Lab #	Volume (liter)	Openings Examined	<u>Fibers Counted</u>			Limit of Detection (f/mm ²)	<u>Total Asbestos</u>	
				Chrys	Amph	Total Asbestos		(f/mm ²)	(f/cc)
OHM-0911-11	29679	1,848	40	0	0	0	1.9	<1.9	<0.00040
OHM-0911-Blank	29680	Blank	10	0	0	0	7.7	<7.7	---

Chrys: Chrysotile Asbestos Amph: Amphibole Asbestos F: fibers >5µm length, >0.25 µm diameter, ≥ 3:1 length:width

Analytical Method: NIOSH 7402, May 15, 1989.

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Table 3

Analytical Results of Bulk Material Sampling for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material	
				Accessibility	Friability
<u>DWELLING 1</u>					
OHM-0911-100-A (139251)	Filter Material from Air-Conditioning Unit, 2nd Floor Master Bedroom	NAD			
OHM-0911-100-B (139252)	Filter Material from Air-Conditioning Unit, 2nd Floor Master Bedroom	NAD			
OHM-0911-101 (139253)	Roof Felt Paper on South Wall, Attic	NAD			
OHM-0911-102 (139254)	Settled Dust, Basement, South, near Stairs	NAD			
OHM-0911-103 (139255)	Settled Dust, Basement, Center	NAD			
OHM-0911-104 (139256)	Settled Dust, Basement, North Rear, near Doorway	NAD			
OHM-0911-118 (139283)	Sheetrock on Floor, Basement, Center in Walkway, on Floor	NAD			

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Table 3

Analytical Results of Bulk Material Sampling for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material Accessibility	Friability	
<u>DWELLING 2</u>						
OHM-0911-105A (139257)	White Fibrous Insulation, 1st Floor, Inside North Wall	Layer 1:	75 Chrysotile	Poor	Easy	High
		Layer 2:	65 Chrysotile			
		Total Asbestos:	70			
OHM-0911-105B (139258)	White Fibrous Insulation, 1st Floor, inside South Ceiling near Doorway		NAD			
OHM-0911-105C (139259)	White Fibrous Insulation, 2nd Floor, Inside North Wall	Layer 1:	NAD			
		Layer 2:	NAD			
		Total Asbestos:	NAD			
OHM-0911-106A (139260)	Black Covering on Fibrous Insulation, 1st Floor, North Wall		NAD			
OHM-0911-106B (139261)	Black Covering on Fibrous Insulation, 1st Floor, East Wall near Door		NAD			
OHM-0911-106C (139262)	Black Covering on Fibrous Insulation, 1st Floor, East Wall, North Side		NAD			

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Table 3
Analytical Results of Bulk Material Sampling for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material Accessibility	Friability
DWELLING 2					
OHM-0911-107A (139263)	Upper Layer of Floor Covering, 1st Floor, South Area near Doorway	Layer 1: 60 Chrysotile	Poor	Easy	Moderate
		Layer 2: 50 Chrysotile			
		Layer 3: NAD			
		Total Asbestos: 45			
OHM-0911-107B (139264)	Floor Covering, Upper Layer, 1st Floor, Northeast End	Layer 1: 55 Chrysotile	Poor	Easy	Moderate
		Layer 2: NAD			
		Layer 3: NAD			
		Layer 4: NAD			
		Total Asbestos: 30			
OHM-0911-108A (139265)	Floor Tile, 2nd Layer, 1st Floor, Southeast Room	Layer 1: NAD	Poor	Easy	Moderate
		Layer 2: NAD			
		Total Asbestos: NAD			
OHM-0911-108B (139266)	Floor Tile, 2nd Layer, 1st Floor, Southeast Room	Layer 1: NAD	Poor	Easy	Moderate
		Layer 2: NAD			
		Total Asbestos: NAD			
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Table 3
Analytical Results of Bulk Material Sampling for Asbestos

at
257 New Vernon Road
Meyersville, New Jersey
for
Oll Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material	
				Accessibility	Friability
DWELLING 2					
OHM-0911-109A (139267)	Floor Tile, 2nd Layer, 1st Floor, Northeast Room	Layer 1: 10 Chrysotile	Poor	Moderate	Low
		Layer 2: NAD			
		Total Asbestos: 10			
OHM-0911-109B (139268)	Floor Tile, 2nd Layer, 1st Floor, Northeast Room	Layer 1: 10 Chrysotile	Poor	Moderate	Low
		Layer 2: NAD			
		Total Asbestos: 10			
OHM-0911-110A (139269)	Plaster Material, 1st Floor, Southeast Area, North Dividing Partition	Layer 1: NAD			
		Layer 2: NAD			
		Total Asbestos: NAD			
OHM-0911-110B (139270)	Plaster Material, 1st Floor, North Area, North Wall	NAD			

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Analytical Results of Bulk Material Sampling for Asbestos

at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/P-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of	
				Material	Friability

DWELLING 2

OHM-0911-110C	Plaster Material, 2nd Floor, North Area, Ceiling	Layer 1: NAD Layer 2: NAD Layer 3: 2 Amosite Layer 4: NAD Layer 5: 2 Crocidolite	Poor	Easy	Low
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Total Asbestos:		< 1
Layer 1:	NAD	
Layer 2:	NAD	
Layer 3:	2 Amosite	
Layer 4:	NAD	
Layer 5:	2 Crocidolite	

OHM-0911-111A	Shingles, Basement, North Wall	Layer 1: NAD Layer 2: NAD Layer 3: NAD			
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Total Asbestos:		NAD
Layer 1:	NAD	
Layer 2:	NAD	
Layer 3:	NAD	

OHM-0911-111B	Shingles, Basement, North Wall	Layer 1: NAD Layer 2: NAD Layer 3: NAD			
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Total Asbestos:		< 1
Layer 1:	NAD	
Layer 2:	NAD	
Layer 3:	75 Chrysotile	

OHM-0911-112A	Roofing Felt Material, Basement, East Wall near Stairwell leading to (Outside)	NAD	Fair	Easy	Low
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Table 3
Analytical Results of Bulk Material Sampling for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material Accessibility	Friability
DWELLING 2					
OHM-0911-113A (139275)	Brown Mastic Material on Floor, 2nd Floor, Southeast Room	NAD			
OHM-0911-113B (139276)	Brown Mastic Material, 2nd Floor, Southeast Room	Layer 1: NAD Layer 2: NAD Total Asbestos: NAD			
OHM-0911-118A (139284)	Blue Fibrous Insulation Material, 2nd Floor, Inside North Ceiling	Layer 1: 5 Amosite Layer 2: 60 Crocidolite Total Asbestos: 65	Poor	Easy	High
GARAGE					
OHM-0911-114A (139277)	Roof Shingles, Storage, Upper Floor	Layer 1: NAD Layer 2: NAD Total Asbestos: NAD			
OHM-0911-115A (139278)	Roofing Felt Material, Stored, Upper Floor	NAD			

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Table 3

Analytical Results of Bulk Material Sampling for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material Accessibility	Friability
<u>GARAGE</u>					
OHM-0911-116A (139279)	Roofing Felt on Window, 1st Floor, Northwest Corner Window	NAD			
<u>SHED 1 (NEXT TO DWELLING 1)</u>					
OHM-0911-117A (139280)	Roofing Material, Northeast Corner				
		Layer 1:	NAD		
		Layer 2:	NAD		
		<u>Layer 3:</u>	<u>NAD</u>		
	Total Asbestos:	NAD			
OHM-0911-117B (139281)	Roofing Material, Southwest Corner				
		Layer 1:	NAD		
		Layer 2:	NAD		
		<u>Layer 3:</u>	<u>NAD</u>		
	Total Asbestos:	NAD			

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Table 3

Analytical Results of Bulk Material Sampling for Asbestos
at
257 New Vernon Road
Meyersville, New Jersey
for
OH Materials Corporation

Clayton Project No. 31204.00/F-19615

September 11, 1990

Sample Number	Sample Location/Description	Asbestos Content (Percent and Type)	Condition	Description of Material	
				Accessibility	Friability

SHED 1 (NEXT TO DWELLING 1)

OHM-0911-117C Roofing Material, Southwest Corner
(139282)

Layer 1: NAD
Layer 2: NAD
Total Asbestos: NAD

Analytical Method: U.S. EPA; "Interim Method for the Determination of Asbestos in Bulk Insulation Samples"; EPA-600/M4-82-020; December, 1982.

Percentages are visual estimates based on volume.

Limit of Detection: <1%

Limit of Quantitation: 1%

NOTE: The reliable limit of quantitation of the method is 1%, although asbestos may be qualitatively detected at concentrations less than 1%. Samples for which asbestos is detected at <1% are reported as "trace, <1%." No asbestos detected (NAD) indicates that no fibers were observed.

Clayton's Edison, New Jersey laboratory is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP Lab No. 1125-02). This test report relates only to the items tested and may not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

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The tables in this Appendix include the following information:

(A) Material Sampled

A physical description of the material sampled in the assessed building or structure.

(B) Location of Material in Building

The location of the material (e.g., pipe wrap or joint insulation) in the assessed building or structure

(C) Condition

The condition of the material present, which was subjectively evaluated by the investigator (e.g., good, fair, or poor)

(D) Accessibility

Accessibility to the material was evaluated as:

- S (Staff only)--materials behind locked doors (e.g., boiler rooms) and materials above dropped ceilings (e.g., pipe joint wrap)
- M (Moderate)--materials which can be seen but not reached without some effort (e.g., high ceilings).
- E (Easy)--materials within the employees' reach (e.g., low ceilings, stairwell ceilings, wrap on pipes).

(E) Friability

The ability of a material, when dry, to be crumbled, pulverized, or reduced to powder by hand pressure. Friability was subjectively evaluated by the investigator as low, moderate, or high.

(F) Field Identification

The first letters in the column are an abbreviation for the client. The number is the material identification number assigned by the Clayton investigator. At least three representative samples were collected for each type of friable or suspect material sampled as material content is not always uniform.

(G) Sample Location

The physical location where the sample was collected in the assessed building or structure.

(H) Estimated Percentage and Type

The numbers indicated the percentage of each typed of asbestos present in the sample. Percentages are not reported for materials not containing asbestos.

Values reported as less than 1 percent indicate that asbestos was identified; however, it was not identified in sufficient amounts for quantification by this method.

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APPENDIX B
SAMPLING AND ANALYTICAL METHODS

ABD 002 0423

MDE 0002910

**AIRBORNE FIBER SAMPLING AND ANALYSIS
NIOSH METHOD 7400
A Rules**

Samples for the determination of airborne fibers were collected by drawing air at measured flowrates through open-face cassettes containing 25-millimeter diameter cellulose ester membrane filters using battery- and electrically-powered portable sampling pumps. Pumps were calibrated before and after sampling to determine and verify flowrates.

Samples were collected with the filter face downward. Area samples were positioned so that the filter is between three and six feet above the floor to approximate workers' breathing zone. Unless otherwise mentioned in the sample description, all area samples are collected at fixed locations throughout the sampling period.

Each sample was analyzed for fibers using the microscopic technique currently specified by the National Institute for Occupational Safety and Health (NIOSH). The technique is as follows: a half-moon shaped sector of each filter is carefully cut from the sample and mounted on a standard microscopy slide, using a mixture of diethyl oxalate and dimethyl phthalate to render the filter transparent.

Fibers, defined as particles having aspect ratios (apparent length to width) of 3 or greater, which were observable on the surface of the filter, were counted using a binocular microscope equipped with 10X eyepieces and a 40X objective with phase contrast illumination. Walton-Beckett graticule fields selected at random on the sample were examined, and fibers greater than 5 micrometers in length were counted until either of two conditions was satisfied:

1. A minimum of 100 fibers were counted in 20 or more fields.
2. A minimum of 100 fields were examined.

Results of the microscopic analysis are used in conjunction with field sampling data (measured flowrates and durations of sampling) to calculate the concentrations of the airborne fibers corresponding to each sample in units of fibers greater than 5 micrometers in length per cubic centimeter of air.

ABD 002 0424

**METHOD FOR ANALYSIS OF AIRBORNE ASBESTOS FIBERS
USING TRANSMISSION ELECTRON MICROSCOPY (TEM)
BY THE NIOSH 7402 METHOD**

Upon receipt in the laboratory, filters are transferred to a glass slide with a drop of dimethyl formamide/acetic acid clearing solution. After clearing, samples are partially ashed in a plasma ashed. The filters are then carbon coated in a vacuum evaporator. Portions of the cleared/ashed/coated filters are excised and placed on 200-mesh copper TEM grids in a wick-type solution washer containing 100% dimethyl formamide.

Two grids are placed consecutively in the TEM for examination. Twenty openings are examined on each grid at approximately 4,000X magnification. Asbestos structures containing fibers which meet a >3:1 length:width aspect ratio, a diameter greater than 0.25 micrometers, and a length greater than 5 micrometers are identified using morphology, selected area electron diffraction, and energy-dispersive x-ray spectroscopy. Fibers are sized (length and width) and are identified as chrysotile, amphibole, ambiguous, or nonasbestos.

Results are reported as total asbestos fibers per square millimeter of filter and asbestos fibers per cubic centimeter of air (asbestos fibers/cc).

NIOSH, Method 7402 for Asbestos, May 15, 1989

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METHOD OF ANALYSES FOR ASBESTOS BULK USING POLARIZED-LIGHT MICROSCOPY (PLM)

When a bulk asbestos sample is received, several representative portions of the sample are removed and put into a labeled petri dish. The sample parts are examined through a stereobinocular microscope and fibers are extracted using forceps. These extracted fibers are then placed on a microscope slide and mounted using a refractive index solution [high dispersion (HD) Cargille liquid].

After being mounted, the fibers are identified using polarized-light microscopy (PLM), supplemented by dispersion staining.¹ After fiber identification by PLM, an estimation is made as to the percentage (area) composition of asbestos. The estimated percentages are based on size, number, shape, and density of each of the components, and comparison to a standard set of samples previously quantitated by the interim Research Triangle Institute (RTI) method.²

¹ McCrone, Walter C., The Asbestos Particle Atlas, Ann Arbor Science Publishers, Inc., 1980.

² Research Triangle Institute, Interim Method for the Determination of Asbestiform Minerals in Bulk Insulation Samples, pp. 8-12, 1982.

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APPENDIX C
PRECAUTIONARY MEASURES
FOR
ROUTINE MAINTENANCE AND REMODELING OPERATIONS

ABD 002 0427

A. Maintenance Activities

The following precautions should be taken whenever maintenance activities could potentially disturb or release asbestos fibers. These precautions are required by the Occupational Safety and Health Administration (OSHA) asbestos standard found in the Code of Federal Regulations (29 CFR 1926.58).

Maintenance activities should be performed when the affected area is unoccupied. If any asbestos-containing materials have been dislodged during maintenance work, the affected area should be cleaned with a vacuum system equipped with high efficiency particulate air (HEPA) filters. Accumulations of asbestos dust should be cleaned with a HEPA vacuum or by wet mopping. Dry sweeping should not be done as it causes fibers to become airborne.

Persons performing maintenance work should be monitored for exposure to asbestos fibers. Maintenance workers should be provided with and required to wear respirators approved by the National Institute for Occupational Safety and Health (NIOSH). Each maintenance employee should be trained in the correct use and maintenance of these respirators, evaluated by a physician to determine his or her ability to use a respirator, and be fit-tested to determine that the respirator selected will provide adequate protection.

Maintenance workers should receive instruction in the potential health effects of asbestos and in safe work practices, including what precautions to take to minimize disturbing the asbestos-containing materials.

B. Renovation Activities

Any plans for building renovation should be carefully evaluated to determine if such activities will involve disturbing asbestos-containing material. If so, the following precautions should be taken as required or recommended by the USEPA or OSHA.

The renovation area should be isolated from the remainder of the facility. Typically, this involves constructing a temporary plastic barrier with an "airlock" for worker entry. Ventilation in the zone should be temporarily isolated (the air movement system between the renovation area and neighboring areas should be shut off) and an exhaust fan used to place the renovation area under a slight negative air pressure compared to the surrounding area. The fan used should exhaust to the outside and be equipped with a HEPA filter.

All persons entering the renovation area should be provided with and required to use NIOSH-approved respirators and disposable coveralls and caps. Requirements for fit-testing and medical evaluation as described above for maintenance workers also apply to renovation workers. Air monitoring should be performed routinely around the perimeter of the renovation area to ensure that asbestos fibers are not released into other areas of the building. Personal sampling should also be conducted to evaluate potential exposures of renovation workers to asbestos.

Construction debris which may contain asbestos must be sealed in impermeable containers, labeled, and disposed in accordance with USEPA and OSHA requirements.

Warning signs must be posted around the renovation area. These signs must meet current OSHA requirements.

ABD 002 0428

Whenever possible, the asbestos-containing materials should be wetted prior to any disturbance to reduce asbestos fiber emission. Before dismantling the barriers at the completion of work, the area should be cleaned thoroughly using vacuums with HEPA filters or wet mops. Clearance air sampling should be conducted at this time to ensure that asbestos concentrations are at or below 0.01 fibers (longer than 5 micrometers) per cubic centimeter of air (f/cc) before routine occupancy. The 0.01 f/cc limit is the EPA-recommended criterion for clearance following construction activities involving asbestos-containing materials.

ABD 002 0429

APPENDIX D
TOXICOLOGICAL INFORMATION

ABD 002 0430

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ASBESTOS

Asbestos is a generic term referring to various fibrous mineral silicates, including chrysotile (hydrated magnesium silicate), amosite (iron-magnesium silicate), crocidolite (sodium-iron silicate), tremolite (calcium-magnesium silicate), anthophyllite (another iron-magnesium silicate), and actinolite (calcium-magnesium-iron silicate).

The potential health hazards associated with exposure to asbestos result from inhalation of airborne fibers; small asbestos fibers can pass readily through the upper respiratory tract and be deposited in the terminal bronchioles of the lung. There they can produce a local irritation which the body attempts to overcome by initiating a tissue response resulting in the encapsulation of the fibers and consequent formation of "asbestos bodies." Asbestos fibers are the causative agents in cases of asbestosis, a progressive disease characterized by diffuse interstitial fibrosis and, at times, pleural changes of fibrosis and calcification. It is often evident by such clinical signs as rales and dyspnea. In its severe form, asbestosis can contribute to, and result in, death due to the inability of the body to obtain oxygen or the heart to pump blood through the scarred lungs.

Exposure to airborne asbestos fibers has also been associated with bronchogenic carcinoma (a malignancy of the interior of the lung), mesothelioma (a diffuse malignancy of the lining of the chest cavity or abdomen), and cancer of the stomach, colon, and rectum. Cigarette smoking can enhance the incidence of bronchogenic carcinoma from this substance.

To protect workers from such occupational hazards, the Occupational Safety and Health Administration (OSHA) has established a permissible exposure limit (PEL) of 0.2 fibers (longer than 5 micrometers) per cubic centimeter of air (f/cc) determined as an 8-hour, time-weighted average (TWA). This OSHA standard also specifies an action level of 0.1 f/cc, the level at which medical monitoring and other activities are required. OSHA has also promulgated a 30-minute TWA excursion limit of 1.0 f/cc for asbestos.

The National Institute for Occupational Safety and Health (NIOSH) has recommended an 8-hour, TWA exposure limit of 0.1 f/cc, with a peak concentration limit of 0.5 f/cc based on a 15-minute sampling period.

The American Conference of Governmental Industrial Hygienists (ACGIH) has adopted 8-hour, TWA threshold limit values (TLVs), depending on the type of asbestos, as follows:

0.5	f/cc	Amosite
2	f/cc	Chrysotile
0.2	f/cc	Crocidolite
2	f/cc	Other forms

ACGIH lists all forms of asbestos in the category of human carcinogens.

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APPENDIX E
INVESTIGATOR CREDENTIALS

ABD 002 0432

MDE 0002919



New Jersey / New York Hazardous Materials Worker Training Center

(Partially supported by the National Institute of Environmental Health Sciences)

This is to certify that

Jeffrey Kaplan

has successfully completed the course entitled

***Health and Safety for Hazardous Waste Site Investigation Personnel
40 Hours***

conducted by the

Division of Consumer Health Education

Department of Environmental and Community Medicine

University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School



May 7 - 11, 1990

Date

Expiration Date: May 11, 1991

[Signature]
Center Director

[Signature]
Course Director

MDE 0002920

ABD 002 0433

Clayton

STATE OF NEW JERSEY
DEPARTMENT OF COMMUNITY AFFAIRS
BUREAU OF CODE SERVICES

THIS IS TO CERTIFY THAT

Jeffrey I. Kaplan
Has Been Certified As
ASSISTED SAFETY TECHNICIAN
00627

CERTIFICATION NO. 2716790
EFFECTIVE DATE 11/31/92
EXPIRATION DATE 11/31/92
Jeffrey I. Kaplan
Signature of Assistant Safety Technician



ABD 002 0434

MDE 0002921

CLAYTON ENVIRONMENTAL CONSULTANTS, INC.

A Marsh & McLennan Company

Certifies that

JEFFREY KAPLAN

has successfully completed a 2-day course
which meets the U.S. Environmental Protection Agency
Requirements for Asbestos Management Planners
under 40 CFR Part 763.

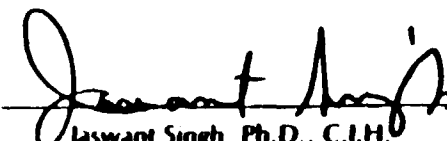
MDE 0002922

Course Date: August 18, 19 89

Location: Novi, Michigan

Certificate Number: CEC-MP-3

Certification expires one year from above date


Jaswant Singh, Ph.D., C.I.H.
Technical Director

Clayton
Environmental
Consultants

ABD 002 0435

CLAYTON ENVIRONMENTAL CONSULTANTS, INC.

A Marsh & McLennan Company

Certifies that

JEFFREY KAPLAN

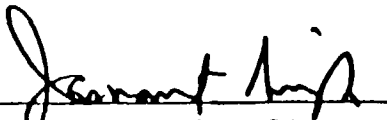
has successfully completed a 3-day course
which meets the U.S. Environmental Protection Agency
Requirements for Asbestos Inspectors
under 40 CFR Part 763.

Course Date: August 16, 19 89

Location: Novi, Michigan

Certificate Number: CEC-BI-3

Certification expires one year from above date


Jaswant Singh, Ph.D., C.I.H.
Technical Director

Clayton

MDE 0002923

ABD 002 0436

Clayton Environmental Consultants, Inc.

Witnesses that

Jeffrey Kaplan

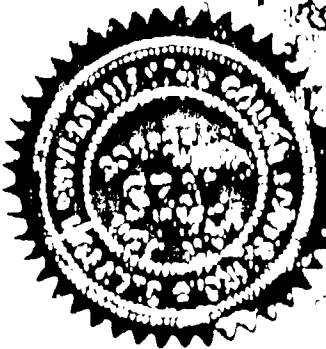
has successfully completed the
Environmental Training Course
(NYS 582 Equivalent)

conducted at Edison, New Jersey on January 28-31, 19 88

February 2, 1988

Lee R. Schumann
Instructor

James M. Smith
Coordinator,
Corporate Training Programs



MDE 0002924

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ARD 002 0437